REMARKS/ARGUMENTS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 1-5 and 7-11 remain pending. Non-elected claims 12-19 have been canceled above to advance prosecution. However, applicant reserves the right to file divisional application(s) for subject matter not ultimately patented herein.

Original claims 1-4, 7, 10 and 11 were rejected under 35 USC §102(b) as being anticipated by Harada. Applicant respectfully traverses this rejection. However, to advance prosecution, the limitations of dependent claim 6 have been incorporated into an amended claim 1 and claim 6 has been canceled. Thus, the Examiner's rejection under §102(b) has been mooted.

Original claims 6, 8, and 9 were rejected under 35 USC §103(a) as being unpatentable over Harada. Applicant respectfully traverses this rejection with respect to claim 1, which incorporates the limitations of previously presented claim 6, and the claims dependent therefrom.

Amended claim 1 is characterized in that it specifies a combination of important technical features of the invention which distinguish it from the applied art. More specifically, claim 1 recites *inter alia* "the internal electrode layer contains not less than 50 percent by weight Cu element", "a diffusion region formed by mutual diffusion of components of the internal electrode layer and the piezoelectric layer to the other layer and comprising at least one component of the piezoelectric material and Cu", "the diffusion region occupies not less than 90 percent of an area of the whole interface between the internal electrode layer and the piezoelectric layer" and "a thickness of the diffusion region is not more than 10 percent of a thickness of the internal electrode layer."

Applicant has recognized that employing a Cu based material containing not less than 50 percent by weight Cu element as an internal electrode layer has the advantage, compared with conventional stacked piezoelectric devices employing a noble metal such Ag/Pd, that material costs can be reduced significantly. Applicant has also recognized that if the Cu content is less than 50 percent by weight, there are problems such as a decline in conductivity of the internal electrode layer (page 6, lines 15-19). Furthermore, since the recited diffusion region exists in an interface between the internal electrode layer and the piezoelectric layer, both layers bond to each other with sufficient bonding strength. With regard to the size of the diffusion region recited in claim 1, applicant has recognized that when the diffusion region is formed in less than 90 percent of the area of the whole interface, there is a possibility that a sufficient bonding strength may not be obtained. Moreover, when a thickness of the diffusion region exceeds 10 percent of the thickness of the internal electrode layer, there is the problem that the piezoelectric properties of the piezoelectric layer decline. Thus, the combination recited in claim 1 provides a stacked piezoelectric device which is inexpensive and has a sufficiently high bonding strength between the internal electrode layer and the piezoelectric layer.

As acknowledged by the Examiner, Harada discloses the use of copper alloy for the electrode material, but does not specify any particular percentage of copper. Furthermore, Harada does not teach any particular dimensions or extent for the "diffusion layer" referenced by the Examiner.

As noted above, the thickness of the claimed diffusion region and the area occupied by the diffusion region as well as the copper content limit recited in applicant's independent claim 1 were determined and adopted to provide an appropriate conductivity of the internal electrode layer, to ensure that the piezoelectric properties of the piezoelectric layer do not decline and to ensure a sufficient bonding strength is obtained. Although the Examiner recognizes that Harada does not in any way teach or suggest the specific limitations recited in claim 1, the Examiner has summarily

concluded that it would be "obvious" to adopt the specific parameters recited in applicant's claims because "selection among known materials and optimization of a known structure are within the skill expected of the routiner". However, it is respectfully submitted that neither Harada nor the remaining art of record teach or suggest the considerations appropriate to the optimization of the parameters recited in applicant's claim 1. Indeed, the prior art of record provides no guidance to the routiner as to the criteria or basis for the optimization the Examiner suggests. Without any teaching or suggestion in the prior art of record of the considerations appropriate to optimizing the parameters recited in applicant's claim 1, it is respectfully submitted that the optimization that the Examiner has alluded to would not "obviously" be undertaken by the skilled artisan without reference to applicant's disclosure. Indeed, without motivation in the prior art of record to optimize the parameters recited in applicant's claims and without guidance in the prior art as to the objects of such optimization, it is respectfully submitted that it is improper for the Examiner to summarily conclude that the unique combination of parameters and attributes recited in applicant's independent claim 1 would have been "obvious" from the simple teaching of copper in Harada.

It is clear that the initial burden of establishing a basis for denying patentability to a claimed invention rests upon the Examiner. In re Piasecki, 745 F. 2d 1468, 223 USPQ 785 (Fed. Cir. 1984). In establishing a *prima facie* case of obviousness under 35 U.S.C. § 103, it is incumbent upon the Examiner to provide a reason why one of ordinary skill in the art would have been led to arrive at the claimed invention from the prior art. Ex parte Clapp, 227 USPQ 972 (BPAI 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from applicant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp. 837 F.2d 1044, 7 USPQ 2d 1434 (Fed. Cir. 1988).

In view of the foregoing, it is respectfully submitted that claim 1 is not anticipated by nor obvious from Harada.

Claim 5 depends from claim 1 and more specifically provides that "the internal electric layer is composed of a copper alloy containing not less than 95.0 percent by weight of Cu element". As noted at page 7 of the specification, in such a case, various copper alloys can be used such as a beryllium copper, a red brass, a phosphor bronze, and the like. Claim 5 is submitted to be patentable over Harada at least by virtue of its dependence on claim 1. Indeed, as noted above, the prior art of record does not teach or suggest the optimization of Harada so as to provide the combination of parameters recited in claim 1. Likewise, Harada fails to teach or suggest the more specific copper content recited in claim 5. Applicant respectfully submits the features in claim 1, and claim 5 dependent therefrom, would not have been obvious to one of ordinary skill in the art because the prior art does not motivate the skilled artisan to embark on an investigation to determine these parameters, much less provide guidance as to the characteristics desired so as to direct such optimization.

Claim 8 depends from claim 1 and further recites the feature that "a thickness of the diffusion region is from 0.001 to 1 micrometer". As mentioned at page 8 of the specification, when the thickness of the diffusion region is less than 0.001 micrometer, there is a possibility that diffusion in the diffusion region is insufficient and the bonding strength declines. On the other hand, if the thickness of the diffusion region exceeds 1 micrometer, there is possibility of causing a decline in the electric conductivity of the internal electrode layer and a decline of the electric resistance of the piezoelectric layer. Thus, the recited range of thicknesses for the diffusion region ensures high bonding strength and superior properties. Once again, the limitations of claim 8 are no where taught or suggested in Harada. Moreover, the skilled artisan is not motivated by Harada, or the remaining art of record, to embark on experimentation, routine or otherwise, to optimize the recited parameter. Importantly, guidance as to the objects of such optimization is no where taught or suggested in the applied art. It is therefore respectfully submitted that it is improper for the Examiner to summarily conclude that the unique and advantageous parameters discovered by applicants, in the combination

specifically recited in applicant's claims, would have been "obvious" from the simple teaching of copper in Harada.

Claim 9 also depends from claim 1 and further recites the feature that "the diffusion region exists continuously in both sides of an interface of the internal electrode layer and the piezoelectric layer", "the interface is located in the diffusion region" and "a part, closer to the internal electrode layer than the interface, of the diffusion region has an oxygen (O) content of not more than 10 percent by weight". This combination, as dependent from claim 1, offers the advantageous effect that "Cu_2O can be inhibited from being generated by further progress of diffusion at the time of a subsequent practical use" as described at page 8, lines 23-32 of the specification. Harada also completely lacks any teaching or suggestion of the above-noted limitation nor would the skilled artisan embarking on experimentation, routine or otherwise, be guided by Harada or the remaining art of record to discover this desirable characteristic or the advantages thereof. It is therefore respectfully submitted that the invention of claim 9 is also patentable over the cited reference to Harada.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

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